DOCUMENT RESUME

ED 121 381 JC 760 223

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TITLE Nursing and Dental Hygiene Selection Procedures. Part 2: An Examination of Academic Variables as Predictors of Success.
INSTITUTION Johnson County Community Coll., Overland Park, Kans.
PUB DATE Mar 76
NOTE 82p.; For a related document, see ED 116 727

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage
DESCRIPTORS Academic Achievement; Academic Aptitude; Admission Criteria; Community Colleges; *Competitive Selection; *Dental Hygienists; Health Occupations Education; *Junior Colleges; *Nurses; Predictive Ability (Testing); *Predictor Variables; Standardized Tests; Success Factors
IDENTIFIERS Johnson County Community College

ABSTRACT

Applicants to Johnson County Community College's nursing and dental hygiene programs are expected to have demonstrated ability in the fields of science and communications, either through high school or college grades or scores on standardized tests. This document relates these various predictor variables to three criteria of success: (1) completion of the program; (2) grade point average in clinical courses; and (3) scores on the Nursing Board or Dental Hygiene Board examinations. Although many of the analyses are based or incomplete data, it is possible to determine that, assuming a minimal academic level, academic qualifications are not a reliable indicator of whether a student will complete the program. These qualifications are, however, useful in identifying students who may have difficulty passing their clinical courses or Board examinations. Once a student has been admitted to a program, the best indicator of the level of performance on the licensing examinations is performance in clinical courses. Recommendations are made regarding the school's structured interview procedure, the need for career orientation, the uses of academic information, and the continuation of data collection. Data used for this study are tabulated and appended. (NHM)

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ED121381

NURSING AND DENTAL HYGIENE SELECTION PROCEDURES

Part 2: An Examination of Academic Variables as Predictors of Success

PREPARED FOR ADMINISTRATIVE REVIEW

March 1976

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

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Office of Institutional Research

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Overland Park, Kansas 66212

JC 760 223

PREFACE

Part one of this report is a preliminary evaluation of a structured interview instrument used during the Spring of 1975 as a tool for the selection of the 1975-76 JCCC first year nursing and dental hygiene classes. Part one was originally printed during the fall of 1975 but is included with part two for reference purposes.

Part two is an analysis of the available data for graduates and withdrawals for both the nursing and dental hygiene programs. Incorporated into the second part is a summary of JCCC research and recommendations to the administration concerning data collection and a recommended procedure for incorporating these data into the annual selection process.

Dr. Diana Kelley and Michael Quanty, respectively, had major roles in the development of parts one and two of this final report. A number of instructional staff have also contributed to the development of this report. They include Richard Burns, Mary Lou Taylor, Elizabeth Fitz, Linda Dayton, Dr. Roberta Ovesiage and Dr. Tom Barnett.

Elaine L. Tatham
Director of Institutional Research

Note:
Part one of this report (pages 1 - 67) was processed for ERIC in its original edition as JC 760 045. It has been deleted from this version.

PART 2

An Examination of Academic Variables as Predictors of Success

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must pass all five to be licensed. A student who fails only one test cannot be licensed but also need only re-take and pass that test which was failed in order to be licensed. Students who, on the basis of their NLN tests, were predicted to obtain a score of 350 plus one standard error of estimate were considered to have a high likelihood of failing their Board examinations. Five such students were identified and given special additional assistance. Three of these students successfully passed, the fourth failed one of the five tests and the fifth failed two tests. Both students successfully passed these tests on a retake in September 1974. The staff felt that the additional assistance had benefited these five students considerably.

The dental hygiene program admitted its first students in the fall of 1972, and the first class graduated in the spring of 1974. Due to the lack of accessible and uniform data, no earlier data analyses have been completed for dental hygiene. The Program Selection Criteria Committee for nursing and dental hygiene recognized the need for some uniform data and recommended in its spring 1974 report that a comprehensive data bank be established on entrants to these programs and that ACT data be collected on all entrants to programs. The ACT, however, was not to be used to screen out applicants unless the applicant elected to use the ACT as a method of meeting the criteria. Last year, some students did present ACT scores as a means of meeting the criteria, but the data are needed on all students if the ACT scores are to become part of a data bank. The Board of Trustees approved in August, 1975, the recommendation that all applicants to the nursing and dental hygiene program be required to take the ACT test. This recommendation will apply

to all applicants for admission during the fall of 1976.

IV. GUIDELINES FOR INTERPRETING THE DATA ANALYSES IN THIS REPORT

The students admitted to the first nursing class and first dental hygiene class were required to provide much more information than subsequent classes. See Appendix A (pages 47-52) of Part I of this report for a summary of previous selection procedures. Although the career coordinators for nursing and dental hygiene felt that a data bank was needed, the College made the decision several years ago not to collect data formally from applicants. This decision has resulted in a paucity of data to analyze. Most of the data is for the first nursing and first dental hygiene classes. The earlier nursing analyses summarized in section III (pages 75 to 77) of this report were supported since the data available were primarily for those students included in the earlier studies.

With complete data available on so few students, the question arises as to whether the students with incomplete data are comparable to the students with complete data. If they are assumed to be similar, conclusions can be made. However, there is insufficient evidence to justify this assumption. The interpretation must consider the possibility that they are not comparable.

The ACT test will not be required of students admitted to the programs until the fall of 1976. Since they will not graduate until 1978, no data analyses can be completed for these students until the fall of 1978 (after they take summer examinations for licensing). Thus, recommendations based on those data analyses cannot be implemented until students apply to be admitted the fall of 1980. The reason for the delay is that letters concerning the selection criteria to be used to admit students for the fall

of 1979 will have to be in the mail before the licensing examination scores will have been received for the 1978 graduation class.

If data analyses are to be used to support changes in selection criteria, then a data bank is a necessity. The recommendations which appear at the conclusion of this report reflect the need for a data bank and the need for cautious interpretation of the analyses which follow.

V. METHOD

Predictor Variables

The Selection Criteria Committee for Nursing and Dental Hygiene has developed and received Board of Trustee approval for the standards to be used in evaluating applicants' qualifications. In general, applicants are expected to have demonstrated ability in the fields of science and communications, either through grades in high school or college, or scores on standardized tests such as the American College Testing Program (ACT), College-Level Examination Program (CLEP), General Educational Development Test (GED) or Dental Hygiene Aptitude Test (DHAT). The actual criteria applicants should meet are given in Appendices C and D. Since these variables were deemed important by the committee and are used to screen applicants, the following analyses used them as predictors of the applicants' success in the programs and attempted to determine their relative importance.

Criteria of Success

The various predictor variables were related to three criteria of success: 1) completion of the program, 2) GPA in clinical courses, and 3) scores on the Nursing Board or Dental Hygiene Board examinations. Thus, an attempt was made to determine 1) whether any of the predictor

variables discriminated between those applicants who successfully completed the program and those who did not, 2) whether these predictor variables gave any indications of how well an applicant would perform academically, and 3) whether the predictor variables were related to the level of performance on the professional licensing examinations.

Data Analyses

Before beginning the data analyses, the available data were examined for completeness. There were so few students with GED and CLEP test scores that they were not included in any analyses. Similarly, so few students had taken two college science classes or two college communications classes that the GPA's for the two most recent college science classes and two most recent communications courses were omitted from most of the analyses.

Means and standard deviations were determined for each class to assure that their scores were comparable before they were combined in the other analyses. T-tests were used to assess any apparent differences. Means and standard deviations were then computed for graduates and withdrawals separately. Again any apparent differences were analyzed by t-tests. Following these analyses, Pearson product moment correlations were calculated between all predictor variables and the criteria of success. Several of the predictor variables were then combined using step-wise multiple regression to predict clinical grade point average and Board scores. Finally, contingency tables were set up to determine if there were any critical scores on any of the variables which could be used as cut-offs for distinguishing between students who graduated and those who withdrew from the programs.

VI. DATA ANALYSES FOR NURSING STUDENTS

Means for Groups by Year

The means and standard deviations of selected variables for the three nursing classes are displayed in Table 1. The groups appear to be quite similar in their scores on the predictor variables. The class of 1975 did have a higher average grade point in college science courses than did the class of 1973 ($\bar{X}_{1975}$=3.3 vs. 2.8, t=3.2, df=69, p<.05), but no other differences among the groups were statistically significant at the .05 level. Thus, all students for whom data were available were considered comparable and were combined in subsequent analyses. It should also be noted that there was a tendency (although not significant at the .05 level) for the means of later classes to be higher on the Medical Board Examinations. The reasons for this increase are not clear. Faculty may have benefited from the experiences of students who took the examinations earlier. Another factor could be that the instructors did tutor students in the class of 1975 after all examinations given during their second year. Regular mass tutoring sessions were held and students were invited to attend.

Means for Graduates and Withdrawals

Since the three classes appeared to be comparable in terms of the predictor variables for those students with the data, the three classes were combined in the following analyses to see if any differences between graduates and withdrawals emerged. Table 2 gives means and standard deviations for these two groups on the various predictor variables. Although graduates tended to score higher on most of the achievement variables, the

differences between the groups were not large and were significant at the .05 level for only three variables. These variables were high school mathematics grade point average (3.5 for graduates vs. 3.1 for withdrawals), college science grade point average (3.2 vs. 2.9) and ACT scores in English (20.3 vs. 17.1). Thus, there was some indication that graduates tended to score higher on the predictor variables than withdrawals, but there was also considerable overlap between the two groups.

Correlations of Predictors with Clinical GPA and Nursing Board Scores

As Table 3 indicates, nearly all the predictor variables were moderately correlated with clinical grade point average and scores on the Nursing Board Examination. The notable exception to this general trend was that scores on the ACT/Mathematics subtest were not correlated with either clinical GPA (correlation was .01) or scores on the Nursing Board Examinations (correlations ranged from -.12 to .06). Thus, there was some indication that most of the predictor variables were related to success in the nursing program. It should be pointed out, however, that most of these variables were also highly correlated with each other. They may, then, all be measuring the same thing (general intelligence, for example). Finally, although the correlations of the predictor variables were significant, they were still rather low and may not be too helpful in predicting the likelihood that an applicant will succeed. For example, a variable which is correlated .30 with a criterion of success can account for only 23 percent of the variance in the latter variable. This would leave 77 percent still unaccounted for. Thus, if any meaningful predictions are to be made, several of these predictor variables will need to be considered.

The correlations between the ACT clinical GPA and the five Nursing Exit subtests ranged from .39 to .61 and were significant at the .001 level. These were then incorporated into the regression analyses employed by the five Nursing Board subtests.

Data Analysis

Stepwise regression analyses were utilized to relate predictor variables to ACT clinical grade point average and to the five Nursing Board examinations. Stepwise regression is used to identify the variable which contributes the most to the prediction of the dependent variable. Succeeding variables are added one at a time in order of their contribution to the predictive of the dependent variable. For each stepwise regression analysis, the standard error of estimate gives an indication of the accuracy a prediction of the dependent variables will be for the selected independent variables. For example, consider the scores on the independent variables for one student. These scores can be used in the prediction equation to estimate the dependent variable's value. The difference between the predicted score and the actual score for the dependent variable is an error of estimate. The standard deviation of these errors of estimate is referred to as the standard error of estimate and can be used to set limits around the predicted score, within which the student's actual score is likely to fall. In a large group, approximately 68% will have actual scores within one standard error of estimate of their predicted scores and approximately 95% will have actual scores within two standard errors of estimate of their predicted scores. The Pearson product moment correlation between the actual scores and the estimated scores is referred to as the multiple correlation coefficient when at least two independent variables are used to estimate the dependent

[illegible]. The square of the multiple correlation coefficient is [illegible] determined given the proportion of the variance in the dependent variable which is accounted for by specifying the independent variables and the regression equation.

The regression analyses were divided into three major groups. They are presented below. One series of analyses examined the predictive relationship of high school rank and the five diff scores (Kindness, Neatness, Behaviorism, Moral Kindness and Happiness) to positive 2000 cumulative grade point average. A second series of analyses used high school rank and the five diff scores as predictor scores on each of the five Working Board Examinations. The third series of analyses used high school rank, the five diff scores and 2000 cumulative GPA as predictor scores on each of the five Working Board Examinations. In the equations that appear as Series I and II as well as in the following narrations, the diff test scores (Kindness, Neatness, Behaviorism, Moral Kindness and Happiness) are labeled as diff(K), diff(N), diff(Beh), diff(M) and diff(Hap). It should also be noted that regression data for thirty subjects was only available for 91 of the 100 graduates.

Prediction of 2000 GPA

The best single predictor of 2000 cumulative average was the student's predetermined high school rank. The correlation with cumulative GPA was .48 and r^2= predicted score of variance (CR_{12}) was 0.23. Thus, approximately one-fourth of the scoring problem with back of the 2000 GPA of 2000 should was across 0.4 of many predictive (Cronbach 84) variance from many high school rank. The equation is:

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predicted clinical GPA and the actual GPA equaled the correlation of .37 between the clinical GPA and the DHAT (Science). For the above equation, the standard error of estimate was 0.37. Thus, approximately two-thirds of the dental hygiene students are expected to have actual GPAs which are within 0.4 of their GPA predicted from the DHAT/Sci score and 95 percent of the actual GPAs are expected to be within 0.8 of the predicted score. The DHAT/Sci score, then, can give some indication of how well a student will perform in the clinical courses.

Prediction of Dental Hygiene Board Examination Scores from DHAT Scores

All four of the scores on the DHAT subtests made a statistically significant contribution to the prediction of the Dental Hygiene Board Examination (DHB) score. The resulting equation is given below. Variables appear in order of the significance of their contribution.

$$\text{DHB score} = 77.5 + 1.0(\text{DHAT/Rdg}) + 1.0(\text{DHAT/Sci}) - 1.2(\text{DHAT/Num}) + .5(\text{DHAT/Gen});\ F(4,27) = 2.95,\ p<.05$$

The multiple correlation was .55 and the standard error of estimate was 5.7.

If only the two best predictors, DHAT/Rdg and DHAT/Sci are included, the equation becomes:

$$\text{DHB score} = 75.4 + 1.3(\text{DHAT/Rdg}) + .8(\text{DHAT/Sci});\ F(2,29) = 3.68,\ p<.05,$$

with a multiple correlation of .45 and standard error of estimate of 5.9. It should be noted that with these equations, very few students would be predicted to fail the Dental Hygiene Board Examination. Since a score of 75 is needed to pass and the constants for both equations are more than 75, the weighted total of the DHAT scores would need to be negative to predict failure for a student. This is, of course, a possibility because scores on the DHAT can go as low as -1. Also, DHAT/Num receives a negative

weight, so a high score on that subtest combined with relatively low scores on the other subtests could result in a predicted score of below 75. One likely reason for the relatively high value of the constant in the regression equations is that only one student actually failed the test so that, given these data, there was little reason to predict low scores. When this one failing student's actual DHAT scores were entered into the equation, the student's predicted score was 78. Although this is not below the necessary 75, it is within one standard error of estimate. As a result, this student could have been identified as someone needing special attention.

Prediction of Dental Hygiene Board Examination Scores from Clinical GPA and DHAT Scores

Entering clinical GPA into the stepwise regression equation to predict the Dental Hygiene Board Examination Scores increased the power of the prediction dramatically. In fact, clinical GPA alone was a better predictor than the four DHAT subtests combined. If only Clinical GPA is used, the regression equation is:

DHB score = 52.5 + 10.3(Clinical GPA); $F(1,30) = 20.66$, $p<.001$

For the students used in the development of this equation, the correlation between Clinical GPA and Dental Hygiene Board Examination Score was .64, while the standard error of estimate for the DHB score was 5.0. Since the passing DHB score is 75, this equation, then, would predict that someone making a 2.0 GPA in the clinical courses would fail the Board examination. The final regression equation, including clinical GPA and the four DHAT scores was:

DHB score = 54.3 + 8.7(Clinical GPA) + .9(DHAT/Rdg) - .9(DHAT/Num) + .4(DHAT/Gen) + .3(DHAT/Sci); $F(5,26) = 6.07$, $p<.001$

The multiple correlation was .73 and the standard error of estimate was 4.7. Adding the four DHAT scores to the equation, then, increased the correlation by only 0.09. Thus, as with nursing students, once an applicant enters the program, the best single indication of performance on the Board Examination is performance in the JCCC clinical courses.

Contingency Tables

Several cut-off points for 15 predictor variables were examined to determine whether there were any critical scores which would distinguish between graduates and withdrawals. None were found. For some variables, there may have been insufficient data (e.g., no ACT scores were available for 26 applicants), but on the other variables, the proportions of graduates and withdrawals were distributed similarly over the range of scores. Thus, for dental hygiene students, the conclusion was the same as for nursing students. The predictor variables gave some indication of how well a student could be expected to perform in the program, but they did not provide significant indications of who was likely to withdraw from the program. Cut-off points may be useful for selecting students who are likely to perform at a certain level (e.g., make 85 or better on the Board Examination), but the interview instrument may be better for identifying those who are likely to complete the program. In this regard, it should again be noted that although the classes of 1974 and 1975 were quite similar in their scores on the predictor variables, there were no drop-outs from the 1974 class. That class was selected partly on the basis of interviews, in contrast to the class of 1975, which was selected without benefit of interviews and had nine students withdraw from the program.

VIII. SUPPLEMENTARY OBSERVATIONS

Student Age

The mean age at time of admission for nursing students was 30 for the class of 1973, 29 for the class of 1974 and 28 for the class of 1975. Ages have ranged from 17 to 55. The mean age at time of admission for dental hygiene students was 22 for the class of 1974 and 24 for the class of 1975. Their ages ranged from 18 to 39. The age difference between nursing and dental hygienists is worth noting. Perhaps, the field of dental hygiene is less familiar to some of the older students seeking a college education.

Previous College Science and Communications

The number of nursing students who had taken college science courses prior to admission was 28 (62%) for the class of 1973 in contrast to 45 (90%) for the class of 1975. The number of dental hygiene students who had taken college science courses prior to admission was 12 (50%) for the class of 1974 in contrast to 17 (71%) for the class of 1975. Similarly, there has been an increase in the number of nursing and dental hygiene students who have had college communications courses. The college science GPA for the nursing students increased from 2.8 for the class of 1973 to 3.3 for the class of 1975, while the college communications GPA decreased from 2.8 to 2.1. For the dental hygienists, the GPA's in college science and communications for the class of 1974 were very similar to those for the class of 1975.

JCCC Clinical GPA

The mean nursing clinical GPA was 3.0 for the class of 1973 and 2.7 for the class of 1975. For the dental hygienists, the mean clinical GPA

was 3.0 for the class of 1974 and 2.9 for the class of 1975. Lewis and Welch (1975) found that the grade point average in required college pre-nursing courses was the only variable to yield a significant regression weight in a multiple regression analysis predicting grades in upper division core nursing courses. Their criterion was different than either one of the criteria used in the data analyses presented in this report. However, their result corroborates the significance of lower division clinical GPA in predicting other academic criteria.

Interview Procedure

The details of the interview procedure begun in 1975 are presented in Part I of this report. However, some additional observations have been made since the first printing of that report. A few interviewers did not rate applicants on all the interview variables. As a result, some applicants received lower total scores due to omissions of ratings. Therefore, each interview evaluation needs to be checked for completeness. If the interviewer feels unable to rate the applicant on one or more variables, the total score must be adjusted before using it to rank the applicant. One alternative would be to prorate by using the average rating for each missing rating.

Nursing Board Examinations

The results for the 1973-75 Nursing State Board Examination are presented in Appendix A. The data are based on the first attempt at the examination. Even though the difference was not significant, the class of 1974 did not do quite as well as the class of 1973. However, the class of 1975 tended to do better than the class of 1974 despite slightly lower high school rank and GPA, coupled with a slightly lower JCCC clinical GPA. The one increase was previous college science GPA. It would be easy to conclude

that previous college science was the responsible variable. The college science GPA was a significant variable for predicting ASSET nursing clinical GPA and Nursing State Board Examination scores. However, the correlations were low. In addition, the nursing instructors tutored students in the class of 1975 after all examinations during the second year. The nursing staff held regular group tutoring sessions for all students. Therefore, these tutoring sessions could have been the intervening variable which had an impact on the licensing examinations.

A Possible Flaw in the Selection Criteria

The science requirements in the current (and previously used) selection criteria may inadvertently discriminate against high school seniors applying to the program in favor of applicants who have been in college. High school seniors can meet the science criterion by obtaining a 2.5 GPA in high school science courses or scoring at least 22 on the ACT/Science subtest (this was approximately the sixtieth percentile in 1973-1974). Students who have been out of high school for some time can meet the criterion by using college science GPA (2.5) or GED scores. The students included in this data analysis could also use work experience in addition to the above criteria. The average high school science GPA for students admitted to the nursing program was 2.5 and the average ACT/Science score was 19.6, while the average GPA for college science courses was 3.1. Therefore, many students who could not fulfill the science requirement on the basis of their high school record or ACT score may have been able to do so by some of their college courses or work experience. High school seniors with similar high school academic records but no college or work experience would have been rejected. This may explain why so many older students with college credits were admitted to the nursing program.

College science GPA, high school science GPA, and ACT/Science scores were all correlated with success in the nursing program (as measured by clinical GPA and board scores). These predictor measures, however, were not highly correlated with each other. The correlation between high school and college science GPA was .33. When only the two most recent college science courses were considered, the correlation decreased to .27. High school science GPA, college science GPA, and GPA in the most recent college science courses yielded correlations of .36, .31, and .20 respectively with ACT/Science scores. Thus, these science prediction scores may not be comparable. Based on the available data, it may be easier to fulfill the science criterion through college courses (or work experience) than through high school courses on the ACT/Science test. This puts the high school senior at some disadvantage. Since all students are not required to submit ACT scores, the ACT/Science score could be used as the primary science admission criterion for nursing at Texas. This would be advisable for several reasons. The ACT/Science score (1) was the variable most highly correlated with clinical GPA and Nursing Board scores, (2) would discriminate less against high school seniors who have had no college or work experience, and (3) would eliminate any questions about the comparability of grades obtained at different institutions or from different instructors. If the ACT/Science score were to be used as the primary science criterion for nursing students, the cut-off score should be lowered. The ACT/Science means for the nursing classes of 1972, 1973 and 1974 were respectively 20.3, 19.8 and 18.3. The possible cut-off to use is the 15 recommended in the 1972 report by the Office of Institutional Research. The University of Oklahoma (ACT, 1971, p. 49 51-61) uses a composite ACT score of 20 to admit students without a high school copyright. The use of a lower

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implemented based on those data rather than on mere speculation. The information so obtained could not only prove helpful in establishing future selection criteria, but could be used for counseling individuals concerning their potential strengths and weaknesses. It could help them make a wiser decision concerning their academic future.

Recommendation #: That other career programs which may eventually need to limit enrollments begin to collect relevant information from applicants and require any special tests which could prove useful for future selection purposes.

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TABLE 1

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES
FOR NURSING STUDENTS BY YEAR OF GRADUATION

Variable	Year of Graduation					
	1973		1974		1975	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Standardized High School Rank	55.8	9.3	53.6	6.9	51.9	6.9
	(31)		(22)		(35)	
High School GPA	2.8	0.6	2.9	0.5	2.7	0.5
	(44)		(30)		(45)	
Semesters of High School Science	3.9	1.8	3.6	1.7	3.9	1.6
	(48)		(32)		(46)	
GPA in High School Science Courses	2.5	0.7	2.5	0.7	2.5	0.7
	(44)		(31)		(45)	
Semesters of High School Math	4.4	1.7	4.3	1.5	4.4	1.4
	(48)		(32)		(46)	
GPA in High School Math Courses	2.5	0.8	2.7	0.7	2.3	0.8
	(44)		(32)		(45)	
Semesters of College Science	2.8	2.2	2.4	1.3	3.1	2.0
	(28)		(25)		(43)	
GPA in College Science Courses	2.8	0.7	3.1	0.9	3.3	0.6
	(28)		(25)		(43)	
Semesters of High School Communications	8.0	1.4	8.0	1.3	8.0	1.6
	(47)		(32)		(47)	
GPA in High School Communications Courses	2.8	0.6	2.9	0.6	2.7	0.6
	(42)		(32)		(45)	
Semesters of College Communications	2.8	1.7	2.5	1.8	2.1	1.1
	(42)		(28)		(44)	
GPA in College Communications Courses	2.8	0.6	2.8	0.7	2.8	0.8
	(42)		(27)		(44)	
ACT Science	20.3	5.8	19.0	6.0	18.5	5.7
English	19.9	5.1	20.1	3.2	18.9	4.4
Math	16.1	6.0	16.6	6.3	15.6	6.3
Social Science	20.3	6.6	18.8	5.8	21.2	5.2
Composite	19.3	4.5	18.7	4.4	18.7	4.2
	(46)		(22)		(21)	
GPA in Clinical Courses	3.0	0.5	2.8	0.6	2.7	0.7
	(50)		(34)		(46)	

Notes.--1. S.D. denotes standard deviation. The standardized high school rank is a standard score developed by Educational Testing Service and permits the comparison of high school ranks for schools of different sizes. The mean is 50 with a standard deviation of 10. The higher the standard score, the better the student performed in high school relative to other classmates.

2. The numbers in parentheses denote the number of students for whom data were available. The number of graduates were 45, 33 and 41 respectively for the classes of 1973, 1974 and 1975. The number of withdrawals (excluding those readmitted to other classes) were 8, 2 and 9 respectively.

TABLE 1

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES FOR NURSING STUDENTS BY YEAR OF GRADUATION
(continued)

Variable	Year of Graduation					
	1973		1974		1975	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Nursing Board Examination						
Medical	550.4	92.4	552.0	85.7	576.3	92.8
Surgical	540.4	87.4	544.5	86.4	571.8	97.1
Obstetrical	519.4	93.4	520.8	99.4	538.4	91.6
Nursing for Children	545.4	92.9	546.5	101.2	579.4	87.2
Psychiatric	558.0	93.1	543.9	99.2	567.3	79.5
	(45)		(33)		(41)	

Notes.--1. S.D. denotes standard deviation. The standardized high school rank is a standard score developed by Educational Testing Service and permits the comparison of high school ranks for schools of different sizes. The mean is 50 with a standard deviation of 10. The higher the standard score, the better the student performed in high school relative to other classmates.

2. The numbers in parentheses denote the number of students for whom data were available. The number of graduates were 45, 33 and 41 respectively for the classes of 1973, 1974 and 1975. The number of withdrawals (excluding those readmitted to other classes) were 8, 2, and 9 respectively.

TABLE 2

MEANS AND STANDARD DEVIATIONS OF SELECTED VARIABLES FOR NURSING PROGRAM GRADUATES AND WITHDRAWALS COMBINED CLASSES 1973-1975

Variable	Graduates (N=119) Mean	S.D.	n	Withdrawals (N=19) Mean	S.D.	n
Standardized High School Rank	54.1	8.0	80	50.3	[illegible]	8
High School GPA	2.8	.5	102	2.6	.[illegible]	17
Semesters of High School Science	3.8	1.7	108	3.0	1.8	18
GPA for High School Science Courses	2.5	.7	103	2.5	.5	17
Semesters of High School Math	4.4	1.5	108	4.1	1.6	18
GPA for High School Math Courses*	2.5	.8	104	2.1	.6	17
Semesters of College Science	2.9	2.0	85	2.4	1.7	11
GPA for College Science Courses*	3.2	.7	85	2.5	.7	11
Semesters of High School Communications	8.0	1.4	108	8.1	1.7	18
GPA for High School Communications Courses	2.9	.6	103	2.6	.5	16
Semesters of College Communications	2.3	1.6	100	3.2	1.6	14
GPA for College Communications Courses	2.8	.7	99	2.5	.9	14
ACT Science	19.7	6.0	74	18.8	5.2	16
English*	20.3	4.2	74	17.1	4.7	16
Math	16.1	6.2	73	16.1	5.6	16
Social Science	20.4	6.0	73	18.9	6.4	16
Composite	19.2	4.4	73	17.9	4.[illegible]	16

*The mean for graduates was significantly different from that for withdrawals at the .05 level (t-test)

Note.--S.D. denotes standard deviation. The standardized high school rank is a standard score developed by Educational Testing Service and permits the comparison of high school ranks for schools of different sizes. The mean is 50 with a standard deviation of 10. The higher the standard score, the better the student performed in high school relative to other classmates. The n denotes the number of students for whom data were available.

TABLE 3

CORRELATIONS OF SELECTED PREDICTOR VARIABLES WITH CLINICAL GRADE POINT AVERAGE AND NURSING BOARD SCORES FOR NURSING STUDENTS 1973-1975

Predictor Variable	Clinical GPA	Nursing Board Examinations				
		Medical	Surgical	Obstetrical	Children	Psychiatric
High School Rank	.42* (85)	.24* (90)	.27* (88)	.32* (90)	.25 (90)*	.43* (88)
High School GPA	.37* (112)	.17 (102)	.16 (102)	.30* (102)	.26* (102)	.32* (102)
GPA in high school science	.33* (113)	.20* (103)	.21* (103)	.30* (103)	.25* (103)	.25* (103)
GPA in high school math	.30* (114)	.20* (104)	.19 (104)	.28 (104)*	.26* (104)	.23* (104)
GPA in high school math & science	.35* (113)	.23* (103)	.22* (103)	.32* (103)	.28* (103)	.27* (103)
GPA college science	.38* (93)	.30* (85)	.23* (85)	.23* (85)	.31* (85)	.37* (85)
GPA in two most recent college science courses	.30* (44)	.19 (42)	.01 (42)	.13 (42)	.15 (42)	.41* (42)
GPA in high school communications courses	.36* (112)	.20* (103)	.19 (103)	.35* (103)	.27* (103)	.33* (103)
GPA in college communications courses	.28* (100)	.15 (90)	.09 (90)	.16 (90)	.17 (90)	.21 (90)*
GPA in two most recent college communications courses	.37* (44)	.07 (40)	-.05 (40)	.28 (40)	.11 (40)	.15 (40)
ACT Science	.35* (74)	.30* (74)	.18* (74)	.32* (74)	.30* (74)	.41* (74)
ACT English	.30* (74)	.27* (74)	.24* (74)	.33* (74)	.21 (74)	.48* (74)
ACT Math	.21 (73)	.06 (73)	.02 (73)	-.09 (73)	-.12 (73)	.08 (73)
ACT Social Studies	.29* (73)	.30* (73)	.19 (73)	.21 (73)	.27* (73)	.40* (73)
ACT Composite	.37* (73)	.31* (73)	.26* (73)	.23 (73)	.20 (73)	.43* (73)
Clinical GPA	1.00 (116)	.64** (116)	.59** (116)	.50** (116)	.63** (116)	.62** (116)

*These correlations were statistically significant at the .05 level.
**These correlations were statistically significant at the .001 level.
Note.—The numbers in parentheses denote the number of students for whom the data were available.

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[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

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NURSING STATE BOARD INITIAL EXAMINATION RESULTS
SUMMARIZED BY CLASS

Test Scores	Graduates 1973	1974	1975
Medical Nursing			
<350 (Failing)	0.0%	0.0%	2.4%
350-399	8.9	3.1	2.4
400-499	20.0	34.4	14.7
500-599	37.8	31.3	36.6
600-649	20.0	18.8	17.1
650+	13.3	12.4	26.8
Median	564.0	552.0	583.0
Surgical Nursing			
<350 (Failing)	2.2	0.0	2.4
350-399	0.0	3.1	2.4
400-499	31.2	25.0	19.5
500-599	37.8	43.8	29.3
600-649	17.8	12.5	22.0
650+	11.0	15.6	24.4
Median	530.0	545.0	591.0
Obstetrical Nursing			
<350 (Failing)	4.4	3.1	4.9
350-399	8.9	3.1	0.0
400-499	26.7	46.9	24.4
500-599	42.2	21.9	46.3
600-649	11.1	9.4	19.5
650+	6.7	15.6	4.9
Median	541.0	491.0	553.0
Nursing of Children			
<350 (Failing)	4.4	0.0	0.0
350-399	4.4	9.4	2.4
400-499	17.8	28.2	14.6
500-599	46.7	31.2	34.1
600-649	17.8	15.6	26.9
650+	8.9	15.6	22.0
Median	560.0	543.0	594.0

Note.--The scoring for these tests uses standard scores of 500 for the national average and 100 for the standard deviation. Thus, 50 percent would be expected to score 500 or more while the other 50 percent would be expected to score less than 500. Similarly, 15.9 percent would be expected to score 600 or more with another 15.9 percent expected to score 400 or less.

NURSING STATE BOARD INITIAL EXAMINATION RESULTS
SUMMARIZED BY CLASS (cont.)

Test Scores	Graduates 1973	1974	1975
Psychiatric Nursing			
<350 (Failing)	2.2%	6.3%	0.0%
350-399	4.4	3.1	2.4
400-499	15.6	18.7	17.1
500-599	40.0	37.5	43.9
600-649	20.0	18.7	22.0
650+	17.8	15.7	14.6
Median	564.0	541.0	582.0

Note.--The scoring for these tests uses standard scores of 500 for the national average and 100 for the standard deviation. Thus, 50 percent would be expected to score 500 or more while the other 50 percent would be expected to score less than 500. Similarly, 15.9 percent would be expected to score 600 or more with another 15.9 percent expected to score 400 or less.

APPENDIX B

GRADUATE FOLLOW-UP

GRADUATE FOLLOW-UP

Placement of Graduates

The goal of any career program is, of course, the successful employment of graduates in positions commensurate with their training. Students from JCCC career programs are, therefore, contacted six months after graduation to determine whether they have been able to obtain employment.

In 1973, 42 of the 45 nursing graduates were contacted; 36 (86%) of the 42 were employed as nurses, one (2%) was working in an area other than nursing, and five (12%) were unemployed. Thirty-three students graduated in 1974. At the time of the follow-up, 31 (94%) were employed as nurses, while the remaining two (6%) of these were no longer in the labor force. In the follow-up of the 41 nursing graduates from the 1975 class, 39 of the former students were contacted and all (100%) were employed as nurses. Average annual starting salaries for the three classes were $10,322, $8,556 and $9,553 respectively.

For dental hygiene, 21 (91%) of the 23 graduates from the class of 1974 were employed as dental hygienists. The other two (9%) were unemployed at time of initial placement but both are now employed as dental hygienists. All 15 (100%) of the 1975 graduating class found employment as dental hygienists. Average starting salaries were $9,660 in 1974 and $9,735 in 1975.

Thus, as the programs have become established, their graduates seem to have had less difficulty in obtaining employment.

Students' Perceptions of the Programs

As part of the follow-up, students were asked to rate the quality of their training at JCCC. These ratings are summarized below for students who replied.

	Percentage Rating Program as:			
	Excellent	Good	Adequate	Poor
Nursing				
1973	19%	62%	16%	3%
1974	66%	31%	3%	0%
1975	32%	53%	13%	2%
Dental Hygiene				
1974	79%	21%	0%	0%
1975	47%	47%	6%	0%

Students employed in their respective occupations were also asked whether their training at JCCC had helped them obtain their job and if their training had adequately prepared them for their job. All students but two gave an affirmative response to both questions. Thus, for the most part, students were impressed with their training and felt that their training at JCCC had benefitted them in the job market.

Note.--More detailed follow-up data are available from the Office of Institutional Research.

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At the present time the College selects a limited number (50) of individuals to the Nursing Program each fall. The students entering the program will begin their studies during the fall semester. Candidates for the Nursing program need to comply with the procedures listed below:

The prospective candidate should:

1. Consult the College catalog for basic admission requirements to the College.

2. File an Application for Admission and a Supplemental Information Form with the Admissions Office. These forms are available in that office. The deadline date for filing a completed application form is December 31st; however, you are encouraged to complete your application for admission and supplemental information form as early as possible.

3. Request that your high school transcript (or GED scores) be sent to the Admissions Office (E 160) as you file your Supplemental Information Form.

4. Request a transcript from educational institutions beyond high school be sent to the Admissions Office as soon as application for admission is made.

5. Take the ACT test and list Johnson County Community College as a recipient of the results. High school counselors or ACT Counseling Office should be contacted for information about the ACT.

6. ACT transcripts and test scores must be in the Admissions Office by February 1 in order to satisfactorily complete the application. If transcripts and test scores are not received by this date the application will be invalid.

7. Contact the Counseling Office shortly after filing an application and make an appointment with the counselor for Nursing to discuss your career plans. The counselor may be reached at [redacted].

8. By March 1, candidates will be informed whether or not they have met the selection criteria (1 - 6).

9. Applicants meeting the selection criteria should contact the coordinator of the Nursing Program to arrange for personal interviews. Each applicant will have two separate interviews of approximately 20 minutes each.

10. All candidates meeting the minimum selection criteria will be interviewed and ranked. Selection of applicants for acceptance to the program will be based on rank order, proceeding down the list until all available positions are filled.

11. All applicants accepted to the program will be admitted pending review of the complete medical record. The health record will be evaluated by the coordinator of the program and if any factors are unsatisfactory the applicant will be counseled of a place in the next class.

12. Alternates will be selected using the method described in paragraph 10 (according to the [redacted] order procedure).

If you have any questions concerning these steps, contact the Nursing coordinator or the program counselor.

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[illegible]

(a) [illegible]

(i) [illegible]

(ii) [illegible]

(iii) [illegible]

(iv) [illegible]

(v) [illegible]

(b) [illegible]

(i) [illegible]

(ii) [illegible]

(iii) [illegible]

(iv) [illegible]

JOHNSON COUNTY COMMUNITY COLLEGE

NURSING PROGRAM

CURRICULUM

Essential Courses are:

4 Hours - Anatomy NLS 1128
*4 Hours - Physiology NLS 1144
3 Hours - Psychology SS 1068
3 Hours - Child Development SS 3546
6 Hours - NRN 2474 Nursing Care of the Individual: Concepts of Health
8 Hours - NRN 3131 Nursing Care of the Individual: Adaptation to Change
10 Hours - NRN 1550 Nursing Care of the Individual: Short Term Health Problems
10 Hours - NRN 4448 Nursing Care of the Individual: Long Term Health Problems

In addition to the above courses, the student is expected to select 14 credit hours from the following areas:

3 Hours - Social Sciences Area

Sociology
Social Problems

3 Hours - Communications Area

Communications I
Communications II
Speech
Elementary Debate
Creative Writing

3 Hours - Humanities Area

(Any course in this area of study may be selected. See College catalog for course offerings.)

5 Hours - Natural Science Area

Chemistry - 5 Hours
*Microbiology - 5 Hours
Physics - 4 Hours
General Genetics - 3 Hours

Total Hours - 62

*The prerequisite to Microbiology & Physiology is Chemistry.

(Over)

Many of the courses for the Nursing Program require prerequisites. The following program plan demonstrates the proper sequence of classes to insure a logical course of study.

First Year

Fall Semester

Anatomy	- 4 hours
*Communications	- 3 hours
Psychology	- 3 hours
NRN 2474	- 6 hours
	16 hours

Spring Semester

Physiology	- 4 hours
Child Development	- 3 hours
NRN 3131	- 8 hours
	15 hours

Second Year

Fall Semester

*Microbiology (or selected Natural science course)	- 5 hours
NRN 1550	- 10 hours
	15 hours

Spring Semester

*Humanities	- 3 hours
NRN 4448	- 10 hours
*Social Science	- 3 hours
	16 hours

* Specific course to meet this requirement selected by student.

Please Note:

1. Anatomy must be taken prior to or concurrently with NRN 2474. Likewise Physiology must be taken prior to or concurrently with NRN 3131. Anatomy should precede the course in physiology.

2. As noted earlier, the prerequisite to Physiology is Chemistry. Those who have not already taken Chemistry may want to consider taking Chemistry the summer before they start the Nursing Program or during the 1st year Fall semester of the Nursing Program.

3. Child development must be taken prior to or concurrently with NRN 3131 to insure adequate comprehension of care of children.

4. Courses should not be taken out of sequence without prior consultation with the Coordinator of the Nursing Program.

5. Programs should be planned to include courses which will enhance identified weak areas, i.e., if background is deficient in science, this would infer a need for courses in this area.

FEES

The following items are estimated expenses incurred by students in nursing in addition to the tuition fees. These costs are estimates and may vary slightly each year.

Uniforms (including lab coat)	$75.00
Caps	2.70
Name Pins	2.00
Scissors	2.00
Books (depending on student selection)	80.00
Liability insurance (renewable annually)	16.00
N.L.N. Achievement Tests	17.00
Throat Culture (prior to clinical laboratory experience in nursing)	2.50
Pins (graduation)	30.00

Costs of items such as shoes, etc., will depend on individual student selection and need. Transportation to and from clinical agencies is the responsibility of the student. Caps, scissors, and name pins may be purchased from the College Bookstore. Physical examinations, including chest x-rays and immunizations, must be current each year. Costs for health care are the responsibility of the individual student.

October 9, 1972
Revised July 5, 1973
Revised June 6, 1974
Revised Sept. 3, 1975

APPENDIX D

APPLICATION PACKET FOR
DENTAL HYGIENE

JOHNSON COUNTY COMMUNITY COLLEGE

SELECTION PROCEDURE FOR THE DENTAL HYGIENE PROGRAM

At the present time the College selects a limited number (20) of individuals to the Dental Hygiene Program each year. New students entering the program will begin their studies during the fall semester. Candidates for the Dental Hygiene Program need to comply with the procedures listed below:

1. Consult the College catalog for basic admission requirements to the College.

2. File an Application for Admission and a Supplemental Information Form with the Admissions Office. These forms are available in that office. The deadline date for filing a Supplemental Information Form is Dec. 31. However, you are encouraged to complete your Application for Admission and a Supplemental Information Form as early as possible.

3. Request that your high school transcript (or GED scores) be sent to the Admissions Office as soon as you file your Supplemental Information Form.

4. Request a transcript from educational institutions beyond high school be sent to the Admissions Office as soon as application for admission is made.

5. Take the ACT test and list Johnson County Community College as a recipient of the results. High school counselors or JCCC Counseling Office should be contacted for information about the ACT.

6. Take the Dental Hygiene Aptitude Test (DHAT) and have the results sent to Johnson County Community College. This test is given three times a year. Information on when and where it is given can be secured from the Admissions Office. DHAT should be taken no later than February.

7. All transcripts and test scores must be in the Admissions Office by February 1 in order to satisfactorily complete the application. If transcripts and test scores are not received by this date the application will be voided.

8. Contact the Counseling Office shortly after filing an application and make an appointment with the counselor for Dental Hygiene to discuss your career plans. The counselor may be reached at 469-8500.

9. By March 1, candidates will be informed whether or not they have met the selection criteria 1-8.

10. Applicants meeting the selection criteria should contact the coordinator of the Dental Hygiene program to arrange for personal interviews. Each applicant will have two separate interviews of approximately 20 minutes each.

11. All candidates meeting the minimum selection criteria will be interviewed and ranked. Selection of applicants for acceptance to the program will be based on rank order, proceeding down the list until all available positions are filled.

12. All applicants accepted to the program will be admitted pending review of the complete health record. The health record will be evaluated by the coordinator of the program and if the results are satisfactory the applicant will be assured of a place in the fall class.

13. Alternates will be selected using the method described in paragraph 11 (according to the same rank order procedure).

If you have any questions concerning these steps, contact the Dental Hygiene coordinator or the program counselor.

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JOHNSON COUNTY COMMUNITY COLLEGE

SELECTION CRITERIA FOR THE DENTAL HYGIENE PROGRAM

1. Preference is given to the applicant who is a resident of Johnson County.

2. The applicant must be a graduate of an accredited high school (high school is defined as grades 9 through 12) or have completed the GED.

3. The applicant must demonstrate the ability to maintain an overall academic achievement level in any one of the following ways:

   (a) 2.0 or better overall GPA in high school.

   (b) Standard score overall of 50 on the GED.

   (c) 15 hours of college credit with a C or 2.0 GPA.

4. The applicant must demonstrate the ability to succeed in a science-oriented curriculum (science credentials ten years or older are not acceptable) in any one of the following ways:

   (a) 2.5 or better overall GPA in four or more semesters (2 years) of high school science above the introductory level. General science and applied science are not acceptable.

   If an applicant has not taken four semesters (2 years) of acceptable high school science courses, mathematics courses will be considered in lieu of two semesters of science. General and applied mathematics, such as Business Mathematics are not acceptable. The overall GPA of two semesters of science and all semesters of mathematics must be at least 2.5.

   (b) 2.5 or better overall GPA in two or more college science courses. (At the discretion of the Selection Committee only recent grades (last two years) may be considered).

   (c) Standard score of 22 or better on science subsection of ACT.

   (d) GED score in the science section at the eleventh (XXE) percentile or better.

   (e) CLEP - 51 or better standard score in both biology and chemistry section examinations.

   (f) Scores of 4 or above in both the science and study-reading subsections of the Dental Hygiene Aptitude Test (Dental Hygiene only).

5. The applicant must demonstrate ability in communications - written and oral - in any one of the following ways:

   (a) 2.5 or better overall GPA in all semesters of English and Speech courses in high school. Acceptable courses may include English (Composition and Grammar), Speech, Debate and Journalism.

(b) 2.5 or better overall GPA in at least two semesters of college level[1] transferable courses may include English Composition, Speech and Humanities. At the discretion of the Admission Committee only courses grades C-and-two-points-may be considered).

(c) Standard score of 35 on English subsection of the ACT.

(d) 480 sum score in English on the Asset® (ACT) percentile.

(e) CLEP - 50 or better standard score on English Composition General Exam.

4. The applicant must demonstrate personal characteristics necessary for success in health related services (i.e., responsibility, dependability, interpersonal skills and the ability to work with others), by the following ways:

(a) By submitting the names of three (3) references from the following categories:

(1) Employers, past or present.

(2) Directors of volunteer or community service organizations.

(3) Other - excluding relatives and staff members of the College.

(b) By participating in a personal interview with Dental Hygiene and Medical staff of the College.

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